pico ADC-100

High speed Analog to Digital Converter

User Manual

Version 1.2

by

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1 Introduction

The PICO ADC-100 is a high speed analog to digital converter with two input channels and software controlled input ranges.

The unit is supplied with a range or ready-to-use Virtual Instrument and data logging software: alternatively, you can use the ADC-100 driver software to develop your own programs to collect and analyse data from the unit. The software includes:

- PicoScope for DOS and Windows: virtual instrument programs which enable you to use the ADC-100 like an Oscilloscope, Spectrum Analyser or Voltmeter
- PicoLog (optional): DOS program to carry our data logging and analysis
- Clipboard: Windows program to collect data and write it to the clipboard- you can then analyse the data using a spreadsheet
- adc100.exe: DOS program to read in large amounts of data and write it to a text file.

This manual describes the physical and electrical properties of the ADC-100, and explains how to install the software. For information about the software supplied with the unit, please refer to the following documents:

Product	Document
PicoScope for DOS	PicoScope manual
PicoScope for Windows	PicoScope for Windows help file
PicoLog	PicoLog manual Section 6 of this manual
ADC100 clipboard program	Clipboard help file
ADC100 drivers	Driver help file or ADC100.ASC (text file)

2 Safety warning

For all Pico ADCs, the ground input (BNC outer shell) is connected directly to the ground of your computer. This is done in order to minimise interference. As with most oscilloscopes, you should take care not to connect the ground input of the ADC to anything which may be at some voltage other than ground: doing so may cause damage to the ADC. If in doubt, use a meter to check that there is no significant AC or DC voltage.

For computers that do not have an earth connection (for example laptops), it must be assumed that the ADC-100 is not protected by an earth. For such computers, we recommend that only class II (double insulated) oscilloscope probes should be used.

The maximum input voltage range of the ADC-100 is ±20V. Any voltages in excess of ±200V may cause permanent damage to the unit.

The unit contains no user serviceable parts: repair or calibration of the unit requires specialised test equipment and must be performed by Pico Technology Limited or their authorised distributors.

3 EMC

This instrument has been tested according to the requirements of the EMC directive 89/336/EEC. Compliance was demonstrated by meeting the test limits of the following standards:

Emissions
EN50081-1(1992) Generic emission standard for residential, commercial and light industry. Test methods used were:

- EN55022 Conducted, class B
- EN55022 Radiated, class B

Immunity
This product has demonstrated a satisfactory level of immunity in the field.

4 Specification

Resolution	12 bits
Number of input channels	2
Input voltage ranges	software selectable: ±20V, ±10V, ±5V, ± 2V, ±1V, ±500mV, ±200mV [±100mV,±50mV accuracy not guaranteed] manually selectable: AC/DC
Maximum sampling rate	depends on computer: 120k samples per sec on 486/66 100k samples per sec on 386/33 30ksps on 8086/10
Repeatability	±4lsb at 25EC
Absolute accuracy	±1% typical at 25EC ±3% worst case over operating temperature range
Overvoltage protection	±200V
Input impedance	1MS
Input connectors	2xBNC
Output connector	25 way male D-type to computer printer port
Power requirements	No power supply required
Environmental conditions	0 to 70EC 0 to 95% humidity NOT water resistant

5 Installation

5.1 Package Contents

The ADC-100 package should contain the following items:

- ADC-100 unit
- 25 way parallel cable
- PicoScope diskette
- ADC-100 manual
- PicoScope for DOS manual
- ADC-100 adapter (see section 7)

If you ordered PicoLog, the package will also contain the following items:

- PicoLog diskette
- PicoLog manual

5.2 Software

The software diskette contains easy-to-use installation programs for DOS and for Windows that takes you, step by step, through the process of setting up the software.

The Windows software creates a program group for Pico software and help files: if you wish to use any part of the software under Windows, you should therefore use the Windows installation program. If you only intend to use the DOS software, you can use either installation program.

Installing under DOS

1. Insert the software diskette into drive A
2. type A:INSTALL
3. press the Enter key
4. Follow the instructions given to you by the program

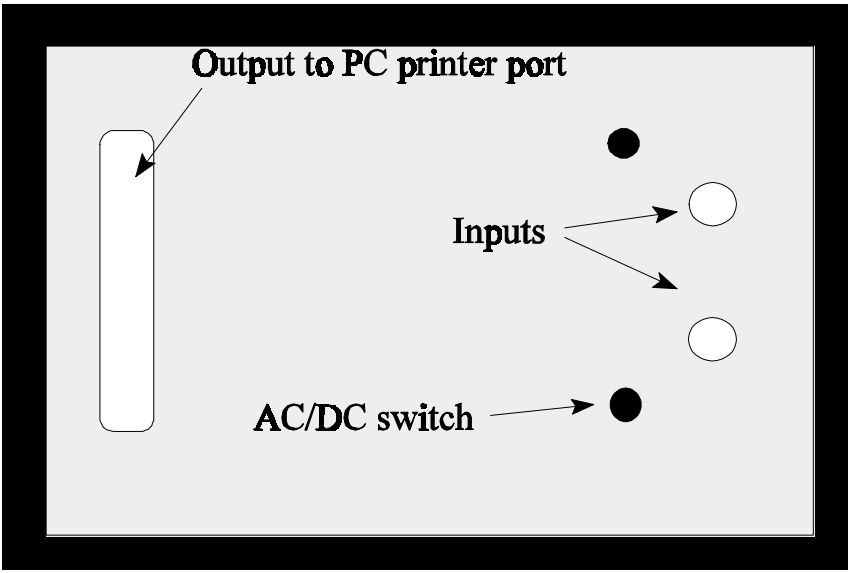
Installing under Windows

1. Insert the software diskette into drive A
2. Select File from the program manager main menu

3. Select Run from the File menu
4. Type A:WINSTALL
5. Press the Enter key
6. Follow the instrunctions given to you by the program

5.3 Hardware

To use the ADC-100, you should connect the D-connector on the ADC-100 to the printer port on your computer using the cable provided. Next, connect a voltage source to one or both of the BNC connectors. The ADC-100 has the same connectors as an oscilloscope, so you can use standard oscilloscope probes. The input impedance is also the same, so the x10 function on a scope probe works correctly.



There is a switch next to each BNC connector: with the switch down, the ADC-100 can measure DC voltages on the BNC next to it. With the switch up, it measures only AC voltages.

To check that the unit is working, start up the PicoScope program. PicoScope should now display the voltage that you have connected. If you are using scope probes, when you touch the scope probe tip with your finger, you should see a small 50Hz mains signal on the screen.

5.4 Problems?

The ADC-100 driver help file (adc100.hlp or adc100.asc) contains useful hints and tips for diagnosing problems with the ADC-100.

The ADC-100 works correctly on most computers, however some computers (mainly laptops) have non-standard printer ports.

For portable computers with this problem, it is necessary to use a special adaptor which plugs into the cable between the computer and the ADC-100. This adaptor is supplied with the ADC-100. The software automatically detects that the adaptor is fitted.

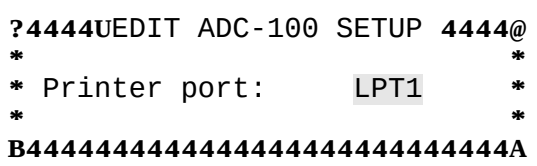
For desktop computers with this problem, you can also use the adapter, but it may be easier to fit an extra printer port to your computer. Pico can supply a very economical printer port card which is guaranteed to work with the ADC-100.

6 Picolog support for ADC-100

This section covers the functions of PicoLog which are specific to the ADC-100. It describes:

- edit ADC-100 setup: specify which printer port the ADC-100 is connected to
- Display voltages: display the parameters that can be measured using the ADC-100
- Add or edit channel: specify details for a channel

6.1 Edit ADC-100 setup



This option is used to specify which printer port the ADC-100 is connected to. The ports must be **LPT1**..**LPT4**.

6.2 Display Voltages

```
?4444444UDISPLAY ADC-100 VALUES 4444444@
*                      Ch A      Ch B   *
*    ADC counts:         545       545   *
*    DC volts:         0.665     0.665   *
*    AC volts:         0.301     0.003   *
*    dB                -1.65     -1.65   *
*    Frequency         135.5    14735.5  *
B444444444444444444444444444444444444444A
```

This option shows you each of the values that you could measure using the **ADC-100**.

Press **Escape** to return to the main menu.

6.3 Edit ADC-100 channel

```
?444444U EDIT ADC-100 CHANNEL W44444444444@
*                                         *
* Channel:              A                 *
*                                         *
* Name:                 Inlet temp        *
*                                         *
* Heading line 1:       Inlet             *
* Heading line 2:       Temp              *
*                                         *
* Voltage range:        ±20V              *
*                                         *
* Measurement mode:     ADC counts        *
* Min frequency:        100  Hz           *
*                                         *
* No of readings:       10                *
* Combination method:   Average           *
*                                         *
* Total measurement time: 2500  ms        *
*                                         *
B4444444444444444444444444444444444444444A
```

The **channel name** will appear on parameter menus. The two lines of **heading** will appear in the headings of tabulation reports.

The **voltage range** is the input voltage range for the ADC channel.

The **measurement mode** can be one of ADC counts, Volts, AC volts, DC volts, frequency or dB. ADC counts and Volts are instantaneous measures: the others are based on a number of measurements dependent on the minumum frequency.

The **min frequency** specifies the number of measurements to be taken for AC and DC volts, frequency and dB measurements. The lower the minimum frequency, the longer the time for each sample.

The **number of readings** specifies how many readings will be taken for this channel for each sample. The **combination method** defines how the readings will be combined to form a sample. It can be **minimum**, **maximum** or **average**. **Average** is useful to reduce the effects of noise: **Minimum** and **Maximum** can be used to identify extreme values during the sample interval.

The **total measurement time** is the total time to collect all the readings for this sample: it must be less than the sample interval.